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ABSTRACT

Even though the effective use of information resources is critical to government operations, reports of studies by the Information Management and Technology (IMTEC) Division of the General Accounting Office have shown that agencies have frequently had problems in managing these resources. At the request of the Committee on Government Operations of the House of Representatives, all reports of such studies issued between October 1, 1988, and May 31, 1991, were examined. Of the 192 reports, 132 identified one or more problems relating to IRM. These reports covered information management in both the civil and defense sectors and looked at specific information systems as well as broad, government-wide issues. Massive cost overruns, inaccurate data, and poor system performance were frequently experienced. The management and operational problems described in these studies tend to fall into one of 10 different categories, with the most common problem being inadequate management of the information system development life cycle. Other problem areas include an inability to ensure the security and integrity of information systems; an inability of information systems to work together; and data that are inaccurate, unreliable, or incomplete. The first of 12 appendixes that make up the major part of this report summarizes the problem categories by type of problem and number of IMTEC reports per fiscal year, and the next 10 appendixes provide a description and examples of each category, as well as a list of reports that fell under that category. The final appendix lists the major contributors to the report. (BBM)

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Fact Sheet for the Chairman, Committee on Government Operations, House of Representatives

February 1992

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INFORMATION RESOURCES

Summary of Federal Agencies' Information Resources Management Problems

I2054 109

GAO/IMTEC-92-13FS

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United States
General Accounting Office
Washington, D.C. 20548

Information Management and
Technology Division

B-246430

February 13, 1992

The Honorable John Conyers, Jr.
Chairman, Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

The magnitude and complexity of the federal government's information technology resources—the hardware, software, data, and people necessary to support the mission of an organization—require effective and efficient management. These resources are critical to ensuring the effective delivery or conduct of every major government activity. The nation's defense, revenue collection, health programs, and benefits programs all rely on information technology for developing and operating the complex systems required by these programs. Simply put, good management enhances these programs; poor management makes effective program operation impossible to achieve.

Even though the effective use of information resources is critical to government operations, our reports have shown time and again that agencies have had problems in managing these resources. At your request, we have summarized the information resources management (IRM) problems documented in previously issued reports.

To conduct our review, we examined all reports issued between October 1, 1988, and May 31, 1991, by our Information Management and Technology Division (IMTEC). Of the 192 reports that IMTEC issued during this time, 132 identified one or more problems relating to IRM. These reports covered information management in both the civil and defense sectors and looked at specific information systems as well as broad, governmentwide issues. Massive cost overruns, inaccurate data, and poor system performance were frequently experienced.

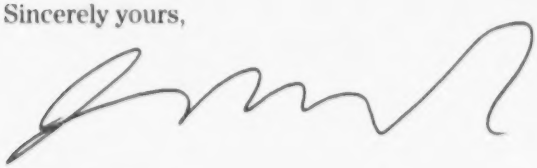
The management and operational problems described in our past work tend to fall into one of ten different categories with the most common problem being inadequate management of the information system development life cycle. Other problem areas include an inability to ensure the security and integrity of information systems; an inability of information systems to work together; and data that are inaccurate, unreliable, or incomplete. Appendix I summarizes the problem categories by type and frequency, and appendixes II through XI provide a description and

examples of each category, as well as a list of reports that fell under each category.

Our work was performed in accordance with generally accepted government auditing standards. As arranged with your office, unless you publicly announce this report's contents earlier, we plan no further distribution of it until 30 days from the date of this letter. At that time, we will send copies to interested parties, and make copies available to others upon request.

Please contact me at (202) 336-6406 if you have any questions concerning this report. Major contributors are listed in appendix XII.

Sincerely yours,



Jack L. Brock, Jr.
Director, Government Information
and Financial Management

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Abbreviations

ADP	automated data processing
CFTC	Commodity Futures Trading Commission
DOD	Department of Defense
EAGLE	Enhanced Automation for the Government Legal Environment
EEOC	Equal Employment Opportunity Commission
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FERS	Federal Employee Retirement System
GAO	General Accounting Office
HCFA	Health Care Financing Administration
IMTEC	Information Management and Technology Division
INS	Immigration and Naturalization Service
IRM	information resources management
IRS	Internal Revenue Service
LAMPS	Light Airborne Multipurpose System
MAISRC	Major Automated Information System Review Committee
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NORAD	North American Aerospace Defense Command
OPM	Office of Personnel Management
SEC	Securities and Exchange Commission
SIDPERS-3	Standard Installation/Division Personnel System III
SSA	Social Security Administration
SPAN	Space Physics Analysis Network

Number of Reports Citing Information Resources Management Problems

Our review of IMTEC's work performed from October 1988 to May 1991 identified 132 reports (out of a total of 192) that described IRM problems. We summarized these problems in ten categories; the table depicts the categories and the number of reports that fell within them each year.

Table I.1: IRM Problems

Problem	Number of reports for fiscal year 1989	1990	1991[a]	Total[b]
Inadequate management of information systems development life cycle	24	33	9	**66**
Ineffective oversight and control of IRM	7	18	4	**29**
Inability to ensure the security, integrity, or reliability of information systems	3	11	2	**16**
Inability of systems to work together	2	8	4	**14**
Inadequate resources to accomplish IRM goals	2	5	2	**9**
Cost overruns	13	6	3	**22**
Schedule delays	10	8	2	**20**
Systems not performing as intended	3	3	1	**7**
Data that were inaccurate, unreliable, or incomplete	4	7	7	**18**
Systems that make access to data time-consuming or cumbersome	2	4	2	**8**

[a]Fiscal year 1991 reports include only those issued before May 31, 1991.

[b]Reports that identified more than one problem are listed under more than one category, so the total number of reports is more than 132.

Inadequate Management of Information Systems Development Life Cycle

The information systems development life cycle refers to the development of a system from its conception to the point at which it is no longer used. It includes all of the activities associated with the analysis, acquisition, design, development, test, integration, operation, maintenance, and modification of a system. Government practice translates this life cycle into a series of discrete steps for managers to follow. Proper management includes steps such as analysis of user/organizational requirements to justify the system, periodic testing of the system during its development phase, and plans for monitoring the work load capacity of the system.

Careful management of the system development life cycle increases the likelihood that the system will perform as intended and will be delivered on time and within budget. Failure to effectively manage the development and modification of information systems was the most frequently reported source of problems. Sixty-six of our reports identified instances in which such management was inadequate. Problems ranged from not doing a proper cost/benefit analysis to inadequate testing of major system modules before the system became operational.

For example, failure to properly plan an information system's development prompted us to question whether further development was warranted. A report on the Health Care Financing Administration (HCFA), part of the Department of Health and Human Services, stated that HCFA had not estimated total costs of a new Medicare claims processing system, did not document its expected benefits and savings, and did not test the system in a way that would generate useful information.[1] The report recommended that the claims processing system—which at the time of the report had become operational—be discontinued if no benefit or cost savings could be proved.

Our reports also identified problems in the later stages of the systems development life cycle. One report questioned the adequacy of the Federal Aviation Administration's (FAA) plan to replace antiquated computers in the Los Angeles basin area because the agency could not adequately judge whether the new computers would solve the major problem with the old system: insufficient computer capacity.[2] A capacity management program—which FAA did not have—could assist in forecasting computer requirements to ensure that computers have sufficient capacity to meet peak demands. The report noted that without such a program, FAA had no

[1]ADP Systems: HCFA's Failure to Follow Guidelines Makes System Effectiveness Uncertain (GAO/IMTEC-90-53, July 26, 1990).

[2]Air Traffic Control: Inadequate Planning Increases Risk of Computer Failures in Los Angeles (GAO/IMTEC-90-49, July 16, 1990).

way to evaluate potential alternatives to both its short-term and long-term plans for the basin.

Related Products

ADP Acquisition: Defense Logistics Agency Has Not Justified Need for Additional Computer (GAO/IMTEC-91-33, May 23, 1991).

FAA Registry Systems: Key Steps Need to Be Performed Before Modernization Proceeds (GAO/IMTEC-91-29, Apr. 9, 1991).

Banks and Thrifts: Cause of Federal Regulators' Delays in Releasing Timely Call Report Data (GAO/IMTEC-91-26BR, Feb. 26, 1991).

Space Shuttle: NASA Should Implement Independent Oversight of Software Development (GAO/IMTEC-91-20, Feb. 22, 1991).

Computer Technology: Air Attack Warning System Cannot Process All Radar Track Data (GAO/IMTEC-91-15, May 13, 1991).

ADP Procurement: Better Capacity Planning Needed at Agriculture's National Finance Center (GAO/IMTEC-91-14, Feb. 13, 1991).

Environmental Data: Major Effort Is Needed to Improve NOAA's Data Management and Archiving (GAO/IMTEC-91-11, Nov. 20, 1990).

Defense Communications: Millions May Be Spent Unnecessarily to Expand Data Network (GAO/IMTEC-91-6, Nov. 7, 1990).

Space Operations: NASA Is Not Archiving All Potentially Valuable Data (GAO/IMTEC-91-3, Nov. 2, 1990).

Information Resources: Management Improvements Essential for Key Agriculture Automated Systems (GAO/IMTEC-90-85, Sept. 12, 1990).

ADP Budget: Potential Reductions to the Department of the Navy's Budget Request (GAO/IMTEC-90-84BR, Sept. 17, 1990).

Securities Industry: Additional Testing Needed to Ensure Efficient Post-Trade Processing of Stocks (GAO/IMTEC-90-83, Sept. 26, 1990).

Embedded Computers: Navy's Approach to Developing Patrol Aircraft Avionics System Too Risky (GAO/IMTEC-90-79, Sept. 28, 1990).

Air Force ADP: Millions Can Be Saved If Automated Technical Order System Is Discontinued (GAO/IMTEC-90-72, Aug. 23, 1990).

FAA Procurement: Competition for Major Data-Processing Project Was Unjustifiably Limited (GAO/IMTEC-90-71, June 11, 1990).

Information Resources: Army Corporate Data Base Disregards Congressional and DOD Direction (GAO/IMTEC-90-64, July 19, 1990).

Air Traffic Control: Continuing Delays Anticipated for the Advanced Automation System (GAO/IMTEC-90-63, July 18, 1990).

Strategic Defense System: Stable Design and Adequate Testing Must Precede Decision to Deploy (GAO/IMTEC-90-61, July 6, 1990).

ADP Budget: Potential Reductions to the Department of the Air Force's Budget Request (GAO/IMTEC-90-57BR, Sept. 26, 1990).

Embedded Computers: Navy Not Ready to Buy Avionics Computers for Its LAMPS Mk I Helicopters (GAO/IMTEC-90-54, May 31, 1990).

ADP Systems: HCFA's Failure to Follow Guidelines Makes System Effectiveness Uncertain (GAO/IMTEC-90-53, July 26, 1990).

Federal Communications Commission: Strategic Focus Needed to Improve Information Resources Management (GAO/IMTEC-90-52, July 20, 1990).

Air Traffic Control: Smaller Terminal Systems' Capacity Requirements Need to Be Defined (GAO/IMTEC-90-50, June 25, 1990).

Air Traffic Control: Inadequate Planning Increases Risk of Computer Failures in Los Angeles (GAO/IMTEC-90-49, July 16, 1990).

Computer Security: Governmentwide Planning Process Had Limited Impact (GAO/IMTEC-90-48, May 10, 1990).

Air Force ADP: Depot Maintenance System Development Risks Are High (GAO/IMTEC-90-46, May 25, 1990).

Retirement System: Concerns About OPM's FERS Automated Processing System Procurement (GAO/IMTEC-90-45, Apr. 4, 1990).

Medical ADP Systems: Composite Health Care System: Defense Faces a Difficult Task (GAO/IMTEC-90-42, Mar. 15, 1990).

FAA Procurement: Major Data-Processing Contract Should Not Be Awarded (GAO/IMTEC-90-38, May 25, 1990).

Air Traffic Control: Ineffective Management Plagues $1.7-Billion Radar Program (GAO/IMTEC-90-37, May 31, 1990).

Coast Guard: Strategic Focus Needed to Improve Information Resources Management (GAO/IMTEC-90-32, Apr. 24, 1990).

Geographic Information System: Forest Service Not Ready to Acquire Nationwide System (GAO/IMTEC-90-31, June 21, 1990).

Information Resources: Management Commitment Needed to Meet Information Challenges (GAO/IMTEC-90-27, Apr. 19, 1990).

Computer Systems: Further Development of Navy's Source Data System Needs to Be Reassessed (GAO/IMTEC-90-25, May 8, 1990).

Air Force ADP: The Personnel Concept III System Is Not Ready for Deployment (GAO/IMTEC-90-22, Feb. 27, 1990).

Submarine Technology: Transition Plans Needed to Realize Gains From DOD Advanced Research (GAO/IMTEC-90-21, Feb. 14, 1990).

Electronic Funds Transfer: Oversight of Critical Banking Systems Should be Strengthened (GAO/IMTEC-90-14, Jan. 4, 1990).

Tax System Modernization: IRS' Challenge for the 21st Century (GAO/IMTEC-90-13, Feb. 8, 1990).

Computer Acquisition: Navy's Aviation Logistics System Not Ready for Deployment (GAO/IMTEC-90-11, Feb. 9, 1990).

Air Force ADP: Systems Funded Without Adequate Cost/Benefit Analyses (GAO/IMTEC-90-6, Dec. 28, 1989).

ADP Budget: Potential Reductions to Army Automation Initiatives (GAO/IMTEC-90-3, Nov. 20, 1989).

Space Operations: NASA Is Not Properly Safeguarding Valuable Data From Past Missions (GAO/IMTEC-90-1, Mar. 2, 1990).

ADP Planning: SSA's February 1989 Report on Computer Modernization Is Incomplete (GAO/IMTEC-89-76, Sept. 25, 1989).

Attack Warning: Defense Acquisition Board Should Address NORAD's Computer Deficiencies (GAO/IMTEC-89-74, Sept. 13, 1989).

Computer Procurement: Hardware Upgrades for Navy Inventory Control System Should Be Delayed (GAO/IMTEC-89-67, Sept. 29, 1989).

Air Traffic Control: Computer Capacity Shortfalls May Impair Flight Safety (GAO/IMTEC-89-63, July 6, 1989).

Air Traffic Control: FAA Needs to Implement an Effective Testing Program (GAO/IMTEC-89-62, Sept. 22, 1989).

ADP Procurement: Navy Improperly Restricted Competition for Its Civilian Pay System (GAO/IMTEC-89-61, June 21, 1989).

ADP Planning: FDA's Plans to Improve Processing of Medical Device and Drug Applications (GAO/IMTEC-89-58, June 13, 1989).

Military Space Operations: Operational Problems Continue With the Satellite Control Computer System (GAO/IMTEC-89-56, Aug. 8, 1989).

ADP Modernization: IRS' Automated Examination System—Troubled Past, Uncertain Future (GAO/IMTEC-89-54, June 22, 1989).

ADP Systems: SSA Efforts in Implementing Its Field Office Modernization (GAO/IMTEC-89-45, May 17, 1989).

ADP Acquisition: Air Force Logistics System Modernization Projects (GAO/IMTEC-89-42, Apr. 21, 1989).

Software Maintenance: SSA's Use of Its Software Measurement Package (GAO/IMTEC-89-38, June 15, 1989).

Computer Procurement: Navy Decision to Terminate Its Standard Automated Financial System (GAO/IMTEC-89-37, Mar. 30, 1989).

ADP Modernization: IRS Needs to Assess Design Alternatives for Its Electronic Filing System (GAO/IMTEC-89-33, May 5, 1989).

Information Technology: Health Care Financing Administration's Budget Process Needs Improvement (GAO/IMTEC-89-31, Aug. 11, 1989).

Air Force ADP: Evaluations Needed to Substantiate Modernization Program Benefits (GAO/IMTEC-89-29, May 5, 1989).

ADP Systems: Army Decision to Use Air Force Military Pay System Appears Advantageous (GAO/IMTEC-89-28, Mar. 1, 1989).

ADP Systems: Better Control Over States' Medicaid Systems Needed (GAO/IMTEC-89-19, Aug. 2, 1989).

Space Defense: Management and Technical Problems Delay Operations Center Acquisition (GAO/IMTEC-89-18, Apr. 20, 1989).

ADP Management: Status of the Army's Logistics and Technical Information Initiatives (GAO/IMTEC-89-10, Oct. 31, 1988).

Computer Operations: Improvements Needed in Social Security's Capacity Management Program (GAO/IMTEC-89-8, Jan. 18, 1989).

Air Traffic Control: FAA Should Define the Optimal Advanced Automation System Alternative (GAO/IMTEC-89-5, Nov. 30, 1988).

Computer Systems: Navy Needs to Assess Less Costly Ways to Implement Its Stock Point System (GAO/IMTEC-89-2, Dec. 14, 1988).

Attack Warning: NORAD's Communications System Segment Replacement Program Should Be Reassessed (GAO/IMTEC-89-1, Nov. 30, 1988).

Ineffective Oversight and Control of Information Resources Management

Without oversight, an agency has no assurance that its system development projects are complying with the applicable standards, regulations, and management practices promulgated by an agency and by the government to reduce the chance of failure or delays. Numerous reports described oversight weaknesses in agencies' information management programs. For example, oversight problems at the Department of Defense were identified in a report that discussed Defense's Major Automated Information System Review Committee (MAISRC), which is responsible for reviewing the development efforts for any information system valued at over $100 million in total cost. One report found that the Office of the Secretary of Defense was not terminating or redirecting development activity even when warranted by the results of MAISRC reviews.[1]

According to another report, the Immigration and Naturalization Service (INS) does not have readily available the information needed to identify, apprehend, and deport criminal aliens.[2] This is due to missing data and to the inability of INS to share data among its own systems. This situation forces agency officials to query a number of different systems. In part, the problem of sharing information throughout INS was due to the agency's not providing adequate oversight of its IRM program. INS had not effectively evaluated its own management of information resources. Evaluations had focused on specific information systems, rather than addressing how effectively INS had managed its information resources as a whole.

A 1990 report identified inadequate controls within the Department of Education as allowing significant abuses in the Stafford Student Loan program.[3] A total of $109 million in new loans was obtained by students who had defaulted on previous loans, and loans that totaled millions of dollars were disbursed to students who had reached their legal loan limits. These errors occurred because Education did not have adequate procedures for checking the accuracy and completeness of data in its loan data base and, therefore, was not able to identify student loan defaulters or determine the amount accrued by borrowers.

[1] Automated Information Systems: Defense's Oversight Process Should Be Improved (GAO/IMTEC-90-36, Apr. 16, 1990).

[2] Information Management: Immigration and Naturalization Service Lacks Ready Access to Essential Data (GAO/IMTEC-90-75, Sept. 27, 1990).

[3] Stafford Student Loans: Millions of Dollars in Loans Awarded to Ineligible Borrowers (GAO/IMTEC-91-7, Dec. 12, 1990).

Related Products

Financial Markets: Active Oversight of Market Automation by SEC and CFTC Needed (GAO/IMTEC-91-21, Apr. 2, 1991).

Space Shuttle: NASA Should Implement Independent Oversight of Software Development (GAO/IMTEC-91-20, Feb. 22, 1991).

Major ADP Systems: DOD Does Not Always Comply With Statutory Restriction on Obligations (GAO/IMTEC-91-16, Jan. 7, 1991).

Stafford Student Loans: Millions of Dollars in Loans Awarded to Ineligible Borrowers (GAO/IMTEC-91-7, Dec. 12, 1990).

Army Battlefield Automation: Oversight Needed to Assure Integrated System (GAO/IMTEC-90-78, July 24, 1990).

Information Management: Immigration and Naturalization Service Lacks Ready Access to Essential Data (GAO/IMTEC-90-75, Sept. 27, 1990).

Justice Automation: Tighter Computer Security Needed (GAO/IMTEC- 90-69, July 30, 1990).

Information System: National Health Practitioner Data Bank Has Not Been Well Managed (GAO/IMTEC-90-68, Aug. 21, 1990).

Army Automation: Decisions Needed on SIDPERS-3 Before Further Development (GAO/IMTEC-90-66, Sept. 5, 1990).

Minerals Management Service: Improvements Planned for Automated Royalty Management System (GAO/IMTEC-90-65, July 27, 1990).

Information Resources: Army Should Limit New Initiatives Until Management Program Is Implemented (GAO/IMTEC-90-58, June 29, 1990).

Embedded Computers: Navy Not Ready to Buy Avionics Computers for Its LAMPS Mk I Helicopters (GAO/IMTEC-90-54, May 31, 1990).

Financial Markets: Oversight of Automation Used to Clear and Settle Trades Is Uneven (GAO/IMTEC-90-47, July 12, 1990).

Air Traffic Control: Ineffective Management Plagues $1.7-Billion Radar Program (GAO/IMTEC-90-37, May 31, 1990).

Automated Information Systems: Defense's Oversight Process Should Be Improved (GAO/IMTEC-90-36, Apr. 16, 1990).

DOD Embedded Computers: Better Focus on This Technology Could Benefit Billion Dollar Weapons Programs (GAO/IMTEC-90-34, Apr. 19, 1990).

Customs Automation: Duties and Other Collections Vulnerable to Fraud and Abuse (GAO/IMTEC-90-29, Feb. 28, 1990).

Computer Systems: Further Development of Navy's Source Data System Needs to Be Reassessed (GAO/IMTEC-90-25, May 8, 1990).

IRS Automation: Procurement Practices Need Strengthening (GAO/IMTEC-90-24, Jan. 12, 1990).

Financial Markets: Tighter Computer Security Needed (GAO/IMTEC- 90-15, Jan. 5, 1990).

Electronic Funds Transfer: Oversight of Critical Banking Systems Should be Strengthened (GAO/IMTEC-90-14, Jan. 4, 1990).

Computer Security: Unauthorized Access to a NASA Scientific Network (GAO/IMTEC-90-2, Nov. 13, 1989).

ADP Budget: Potential Reductions to the Department of the Army's Budget Request (GAO/IMTEC-89-69BR, Sept. 18, 1989).

Futures Markets: Automation Can Enhance Detection of Trade Abuses But Introduces New Risks (GAO/IMTEC-89-68, Sept. 7, 1989).

Information Management: Issues Important to Farmers Home Administration Systems Modernization (GAO/IMTEC-89-64, Aug. 21, 1989).

Air Traffic Control: FAA Needs to Implement an Effective Testing Program (GAO/IMTEC-89-62, Sept. 22, 1989).

Automated Information Systems: Schedule Delays and Cost Overruns Plague DOD Systems (GAO/IMTEC-89-36, May 10, 1989).

Attack Warning: Better Management Required to Resolve NORAD Integration Deficiencies, (GAO/IMTEC-89-26, July 7, 1989).

Financial Integrity Act: Actions Needed to Correct ADP Internal Control Weaknesses (GAO/IMTEC-89-11, May 9, 1989).

Inability to Ensure Security, Integrity, or Reliability of Information Systems

Security of data is an important issue, both to the public and to the government. When agencies collect data, they must be able to ensure that the data are reliable and secure from unauthorized access. The reports included in this category identified problems ranging from unauthorized access to sensitive data to the inability to ensure the reliability or integrity of a system. Several reports stated that actual security breaches had occurred, either in the form of unauthorized access by individuals or computer viruses. Other reports noted agency weaknesses in evaluating potential risk to information systems that left them vulnerable to incursions or damage.

As an example of such an incursion, a report on the computer virus infection of several computers using Internet in 1988—including the Department of Energy's Lawrence Livermore Laboratory and the National Aeronautics and Space Administration's (NASA) Ames Research Center—demonstrated the vulnerability of both government and private-sector networks.[1] Internet is the main computer network used by the United States research community. It includes over 500 networks, including ones sponsored by the National Science Foundation and the Department of Defense. Responsibility for computer security was handled primarily by the sites that own or operate the computers. The various networks making up Internet are the responsibility of the network's sponsor, such as a federal agency or a research consortium. The lack of a lead agency or organization responsible for network-wide security management created difficulties in responding to the virus. Problems communicating information about the virus to members of the network and in coordinating emergency response activities were reported. The amount of damage that could have been done to valuable scientific data is incalculable.

Another report showed that unauthorized users gained access dozens of times to NASA's Space Physics Analysis Network (SPAN), which assists scientists in conducting unclassified space-related research.[2] At the time of the report, agency records showed that unauthorized access had taken place. NASA could not be sure that other incursions had not occurred undetected. Also, NASA could not judge the effectiveness of the security plans it had put in place to address the potential risks to SPAN because it had not performed a security risk analysis.

[1]Computer Security: Virus Highlights Need for Improved Internet Management (GAO/IMTEC-89-57, June 12, 1989).

[2]Computer Security: Unauthorized Access to a NASA Scientific Network (GAO/IMTEC-90-2, Nov. 13, 1989).

According to a 1990 report, the Department of Justice could not ensure the security of highly sensitive information, such as the names of defendants, witnesses, informants, and undercover law enforcement officials.[3] Security weaknesses at Justice had heightened the possibility of unauthorized access to highly sensitive information or the interruption of computer services. For example, control of access to a sensitive data center was inadequate and software that could circumvent computer security safeguards was easily accessible. Also, contingency plans had not been prepared or had not been tested.

Related Products

War on Drugs: Information Management Poses Formidable Challenges (GAO/IMTEC-91-40, May 31, 1991).

Financial Markets: Active Oversight of Market Automation by SEC and CFTC Needed (GAO/IMTEC-91-21, Apr. 2, 1991).

Futures Markets: Use of Automation to Detect Trade Abuses (GAO/IMTEC-90-81, Aug. 24, 1990).

Computers and Privacy: How the Government Obtains, Verifies, Uses, and Protects Personal Data (GAO/IMTEC-90-70BR, Aug. 3, 1990).

Justice Automation: Tighter Computer Security Needed (GAO/IMTEC- 90-69, July 30, 1990).

Information System: National Health Practitioner Data Bank Has Not Been Well Managed (GAO/IMTEC-90-68, Aug. 21, 1990).

Space Communications: Performance of NASA's White Sands Ground Terminal (GAO/IMTEC-90-56, May 29, 1990).

Federal Communications Commission: Strategic Focus Needed to Improve Information Resources Management (GAO/IMTEC-90-52, July 20, 1990).

Computer Security: Governmentwide Planning Process Had Limited Impact (GAO/IMTEC-90-48, May 10, 1990).

Customs Automation: Weaknesses in Revenue Collection at John F. Kennedy International Airport (GAO/IMTEC-90-16, Sept. 27, 1990).

[3]Justice Automation: Tighter Computer Security Needed (GAO/IMTEC-90-69, July 30, 1990).

Electronic Funds Transfer: Oversight of Critical Banking Systems Should be Strengthened (GAO/IMTEC-90-14, Jan. 4, 1990).

Computer Acquisition: Navy's Aviation Logistics System Not Ready for Deployment (GAO/IMTEC-90-11, Feb. 9, 1990).

Computer Security: Unauthorized Access to a NASA Scientific Network (GAO/IMTEC-90-2, Nov. 13, 1989).

Justice Automation: Security Risk Analyses and Plans for Project EAGLE Not Yet Prepared (GAO/IMTEC-89-65, Sept. 19, 1989).

Computer Security: Virus Highlights Need for Improved Internet Management (GAO/IMTEC-89-57, June 12, 1989).

Space Operations: NASA's Communications Support for Earth Orbiting Spacecraft (GAO/IMTEC-89-41, Apr. 7, 1989).

Inability of Systems to Work Together

The ability of systems within or among agencies to communicate and exchange data with each other enables agencies to more effectively perform their missions by sharing information. However, the inability of information systems to share data or work together has been a common problem throughout the federal government. This inability often results when systems are developed without considering interagency or even agencywide needs. In some cases, a lack of planning, problems implementing plans, and changes to requirements have contributed to the problem.

A classic example was discussed in a 1990 report, which stated that the Veterans Administration's (now Department of Veterans Affairs) systems were incompatible and could not readily exchange data within the agency and with external agencies, such as the Department of Defense.[1] To illustrate, the report showed that the Veterans Administration had to wait an average of 2 months to obtain Defense records documenting military service. Because of the delay in receiving records from Defense as well as other problems such as the Veterans Administration's paper-intensive, manual processing system, it was not unusual for a veteran to have to wait over 150 days for a claim to be processed.

Another 1990 report noted that the Army was not able to ensure that its new information systems could share data and work together because it had not completely implemented its IRM program.[2] Specifically, it had not completed development of an Army-wide information system architecture to provide implementation guidance and milestones for the development of new systems. Instead, Army components were developing information systems without any guarantee that the systems would be able to share data and work together.

A recent report highlighted the interoperability problems that the law enforcement community faces in managing the war on drugs.[3] A vital intelligence center for the Coast Guard's law enforcement activity used a system that could not accept data electronically from another system. As a result, Coast Guard personnel had to manually enter large amounts of drug intelligence data into the system. Coast Guard officials acknowledged that valuable time and resources were wasted because of this manual process.

[1]Information Resources: Management Commitment Needed to Meet Information Challenges (GAO/IMTEC-90-27, Apr. 19, 1990).

[2]Information Resources: Army Should Limit New Initiatives Until Management Program Is Implemented (GAO/IMTEC-90-58, June 29, 1990).

[3]War on Drugs: Information Management Poses Formidable Challenges (GAO/IMTEC-91-40, May 31, 1991).

Related Products

War on Drugs: Information Management Poses Formidable Challenges (GAO/IMTEC-91-40, May 31, 1991).

Attack Warning: Costs to Modernize NORAD's Computer System Significantly Understated (GAO/IMTEC-91-23, Apr. 10, 1991).

Defense Communications: Millions May Be Spent Unnecessarily to Expand Data Network (GAO/IMTEC-91-6, Nov. 7, 1990).

Information Resources: Problems Persist in Justice's ADP Management and Operations (GAO/IMTEC-91-4, Nov. 6, 1990).

Army Battlefield Automation: Oversight Needed to Assure Integrated System (GAO/IMTEC-90-78, July 24, 1990).

Resolution Trust Corporation: Stronger Information Technology Leadership Needed (GAO/IMTEC-90-76, July 23, 1990).

Information Management: Immigration and Naturalization Service Lacks Ready Access to Essential Data (GAO/IMTEC-90-75, Sept. 27, 1990).

Information Resources: Army Corporate Data Base Disregards Congressional and DOD Direction (GAO/IMTEC-90-64, July 19, 1990).

Information Resources: Army Should Limit New Initiatives Until Management Program Is Implemented (GAO/IMTEC-90-58, June 29, 1990).

Tax System Modernization: Management Mistakes Caused Delays in Automated Underreporter System (GAO/IMTEC-90-51, July 10, 1990).

Coast Guard: Strategic Focus Needed to Improve Information Resources Management (GAO/IMTEC-90-32, Apr. 24, 1990).

Information Resources: Management Commitment Needed to Meet Information Challenges (GAO/IMTEC-90-27, Apr. 19, 1990).

Justice Automation: U.S. Trustees Bankruptcy Case Management System (GAO/IMTEC-89-73, Sept. 25, 1989).

Attack Warning: Better Management Required to Resolve NORAD Integration Deficiencies (GAO/IMTEC-89-26, July 7, 1989).

Inadequate Resources to Accomplish IRM Goals

Agencies have cited a lack of resources as an impediment to fulfilling IRM goals. Identified constraints included too few technical personnel and budget shortfalls. The most reported problem in this category was a lack of technical expertise.

The Navy believed a limited pool of skilled Ada[1] programmers could cause schedule delays in the development of its new target detection software, according to a 1989 report.[2] The Navy had set an ambitious development schedule in order to have the system on hand for integration with its new Seawolf submarine. The schedule, however, was dependent on experienced Ada programmers. At the time of the report, the contractor developing the software did not have a consistent training program in place for Ada programmers. The report warned of the potential for reduced programmer performance, an increased number of coding errors, or both.

The Internal Revenue Service (IRS) faced a funding deficit in 1989 and 1990 for its ADP conversion of payroll and personnel systems.[3] IRS was not sure it could complete its conversion on schedule or adequately train its payroll and personnel staff on the new system given its constrained budget. One official involved in the conversion process was concerned that if the conversion schedule slipped, costs could be greatly increased in performing the conversion.

Related Products

Defense ADP: Corporate Information Management Initiative Faces Significant Challenges (GAO/IMTEC-91-35, Apr. 22, 1991).

Information Resources: Problems Persist in Justice's ADP Management and Operations (GAO/IMTEC-91-4, Nov. 6, 1990).

Information System: National Health Practitioner Data Bank Has Not Been Well Managed (GAO/IMTEC-90-68, Aug. 21, 1990).

Tax System Modernization: Management Mistakes Caused Delays in Automated Underreporter System (GAO/IMTEC-90-51, July 10, 1990).

[1]Ada is the standard programming language for the Department of Defense.

[2]Submarine Combat System: Technical Challenges Confronting Navy's Seawolf AN/BSY-2 Development (GAO/IMTEC-89-35, Mar. 13, 1989).

[3]Automated Systems: Treasury's Efforts to Improve Its Payroll and Personnel Systems (GAO/IMTEC-90-4, Dec. 15, 1989).

DOD Embedded Computers: Better Focus on This Technology Could Benefit Billion Dollar Weapons Programs (GAO/IMTEC-90-34, Apr. 19, 1990).

Financial Markets: Tighter Computer Security Needed (GAO/IMTEC- 90-15, Jan. 5, 1990).

Automated Systems: Treasury's Efforts to Improve Its Payroll and Personnel Systems (GAO/IMTEC-90-4, Dec. 15, 1989).

Submarine Combat System: Technical Challenges Confronting Navy's Seawolf AN/BSY-2 Development (GAO/IMTEC-89-35, Mar. 13, 1989).

Federal ADP Personnel: Recruitment and Retention (GAO/IMTEC-89-12BR, Feb. 7, 1989).

Cost Overruns

Cost overruns were significant in many of the federal government's information system development efforts we examined. Cost overruns totalling over $7 billion were identified. For example, a 1989 report stated that an IRS system being developed to automate the examination of tax returns had experienced a rise in cost estimates of $800 million.[1] In May 1985, the system was expected to cost $1 billion over the life of the system. IRS' 1988 prediction was that the system would cost $1.8 billion.

In another example, the Air Force had been attempting to modernize the computer systems resident in the North American Aerospace Defense Command's (NORAD) Cheyenne Mountain complex since 1981.[2] As of 1989, the Air Force had estimated it would need an additional $535 million to complete the modernization.

Related Products

Space Data: NASA's Future Data Volumes Create Formidable Challenges (GAO/IMTEC-91-24, Apr. 8, 1991).

Attack Warning: Costs to Modernize NORAD's Computer System Significantly Understated (GAO/IMTEC-91-23, Apr. 10, 1991).

Air Traffic Control: Efforts to Modernize Oceanic System Delayed (GAO/IMTEC-91-2, Jan. 16, 1991).

Information Resources: Management Improvements Essential for Key Agriculture Automated Systems (GAO/IMTEC-90-85, Sept. 12, 1990).

Army Automation: Decisions Needed on SIDPERS-3 Before Further Development (GAO/IMTEC-90-66, Sept. 5, 1990).

Computer Systems: Further Development of Navy's Source Data System Needs to Be Reassessed (GAO/IMTEC-90-25, May 8, 1990).

ADP Budget: Potential Reductions to the Department of Defense's Budget Request (GAO/IMTEC-90-12, Jan. 10, 1990).

Defense Acquisition: Air Force Prematurely Recommends ADP Acquisitions (GAO/IMTEC-90-7, Mar. 29, 1990).

[1]ADP Modernization: IRS' Automated Examination System—Troubled Past, Uncertain Future (GAO/IMTEC-89-54, June 22, 1989).

[2]Attack Warning: Better Management Required to Resolve NORAD Integration Deficiencies (GAO/IMTEC-89-26, July 7, 1989).

Air Force ADP: Systems Funded Without Adequate Cost/Benefit Analyses (GAO/IMTEC-90-6, Dec. 28, 1989).

ADP Modernization: IRS' Automated Examination System—Troubled Past, Uncertain Future (GAO/IMTEC-89-54, June 22, 1989).

Computer Procurement: FAA's $1.5-Billion Computer Resources Nucleus Project (GAO/IMTEC-89-44FS, Mar. 31, 1989).

ADP Acquisition: Air Force Logistics System Modernization Projects (GAO/IMTEC-89-42, Apr. 21, 1989).

Air Traffic Control: Voice Communications System Continues to Encounter Difficulties (GAO/IMTEC-89-39, June 1, 1989).

Computer Procurement: Navy Decision to Terminate Its Standard Automated Financial System (GAO/IMTEC-89-37, Mar. 30, 1989).

ADP Acquisition: Defense Logistics Services Center Modernization Program (GAO/IMTEC-89-32, Mar. 20, 1989).

Attack Warning: Better Management Required to Resolve NORAD Integration Deficiencies, (GAO/IMTEC-89-26, July 7, 1989).

ADP Acquisition: Army Civilian Personnel System (GAO/IMTEC-89-22FS, Mar. 3, 1989).

ADP Acquisition: Naval Aviation Logistics Command Management Information System (GAO/IMTEC-89-21FS, Feb. 23, 1989).

ADP Acquisition: Navy's Efforts to Develop an Integrated Disbursing and Accounting System (GAO/IMTEC-89-20FS, Feb. 8, 1989).

ADP Modernization: Health Care Financing Administration's Software Redesign Contract (GAO/IMTEC-89-15, Mar. 16, 1989).

Air Force ADP: Logistics Systems Modernization Costs Continue to Increase (GAO/IMTEC-89-7FS, Dec. 28, 1988).

Air Traffic Control: FAA Should Define the Optimal Advanced Automation System Alternative (GAO/IMTEC-89-5, Nov. 30, 1988).

Schedule Delays

Schedule delays were significant in many of the federal government's information system development efforts. For example, one report stated that by 1994 the Navy, in its own best estimate, will have spent 17 years developing a system to automate a manual process of preparing and editing data-entry documents for a centralized payroll and personnel system.[1] The system, started in 1977, was to have been operational by 1982. As of February 1990, however, information on only 64 percent of active-duty personnel had been entered into the system. According to the Navy, the system was not expected to be fully operational until 1994, which would make it 12 years overdue.

Another example of schedule problems in systems development involved a new voice communications system being developed by FAA. Implementation of the system was delayed 6 years.[2] The schedule delays occurred in part because FAA and its contractors underestimated the complexity of building the system.

Related Products

ADP Budget: Potential Reductions to the Department of Defense's Budget Request (GAO/IMTEC-91-17BR, Dec. 27, 1990).

Air Traffic Control: Efforts to Modernize Oceanic System Delayed (GAO/IMTEC-91-2, Jan. 16, 1991).

FAA Budget: 1991 Funding Request for Computers and Communications Can Be Reduced (GAO/IMTEC-90-89, Sept. 17, 1990).

Information Resources: Management Improvements Essential for Key Agriculture Automated Systems (GAO/IMTEC-90-85, Sept. 12, 1990).

Army Automation: Decisions Needed on SIDPERS-3 Before Further Development (GAO/IMTEC-90-66, Sept. 5, 1990).

Tax System Modernization: Management Mistakes Caused Delays in Automated Underreporter System (GAO/IMTEC-90-51, July 10, 1990).

FAA Procurement: Major Data-Processing Contract Should Not Be Awarded (GAO/IMTEC-90-38, May 25, 1990).

[1]Computer Systems: Further Development of Navy's Source Data System Needs to Be Reassessed (GAO/IMTEC-90-25, May 8, 1990).

[2]Air Traffic Control: Voice Communications System Continues to Encounter Difficulties (GAO/IMTEC-89-39, June 1, 1989).

Air Traffic Control: Ineffective Management Plagues $1.7-Billion Radar Program (GAO/IMTEC-90-37, May 31, 1990).

Computer Systems: Further Development of Navy's Source Data System Needs to Be Reassessed (GAO/IMTEC-90-25, May 8, 1990).

Defense Acquisition: Air Force Prematurely Recommends ADP Acquisitions (GAO/IMTEC-90-7, Mar. 29, 1990).

ADP Budget: Potential Reductions to the Department of the Navy's Budget Request (GAO/IMTEC-89-75BR, Sept. 18, 1989).

ADP Acquisition: Air Force Logistics System Modernization Projects (GAO/IMTEC-89-42, Apr. 21, 1989).

Air Traffic Control: Voice Communications System Continues to Encounter Difficulties (GAO/IMTEC-89-39, June 1, 1989).

Computer Procurement: Navy Decision to Terminate Its Standard Automated Financial System (GAO/IMTEC-89-37, Mar. 30, 1989).

ADP Modernization: IRS Needs to Assess Design Alternatives for Its Electronic Filing System (GAO/IMTEC-89-33, May 5, 1989).

Medical ADP Systems: Composite Health Care System Operational Tests Extended (GAO/IMTEC-89-30, Apr. 10, 1989).

Attack Warning: Better Management Required to Resolve NORAD Integration Deficiencies (GAO/IMTEC-89-26, July 7, 1989).

Space Defense: Management and Technical Problems Delay Operations Center Acquisition (GAO/IMTEC-89-18, Apr. 20, 1989).

ADP Modernization: Health Care Financing Administration's Software Redesign Contract (GAO/IMTEC-89-15, Mar. 16, 1989).

Air Force ADP: Logistics Systems Modernization Costs Continue to Increase (GAO/IMTEC-89-7FS, Dec. 28, 1988).

Information Systems Not Performing As Intended

Information systems used in daily agency operations have failed to perform the tasks for which they were intended. One example of this problem was the difficulty IRS had with its interim electronic filing system during the 1988 tax filing season.[1] An essential component of IRS' system was the imaging subsystem, which permitted tax examiners to access and annotate images of tax returns, rather than relying on paper originals and copies. When the imaging subsystem did not work, IRS tax examiners had to use stopgap measures such as printing paper copies of the returns, annotating their corrections, and storing these paper records.

In another example, a 1989 report documented that the Air Force was still having critical operational and performance problems with its new satellite communications system.[2] Because of the problems with the computer hardware and software, the new system was only able to handle 55 percent of the communications required between the military satellites and ground facilities. The report concluded that until the technical deficiencies were resolved, the planned deactivation of an older system that was expensive to maintain would be delayed.

Related Products

Banks and Thrifts: Cause of Federal Regulators' Delays in Releasing Timely Call Report Data (GAO/IMTEC-91-26BR, Feb. 26, 1991).

Air Force ADP: Millions Can Be Saved If Automated Technical Order System Is Discontinued (GAO/IMTEC-90-72, Aug. 23, 1990).

Air Force ADP: Depot Maintenance System Development Risks Are High (GAO/IMTEC-90-46, May 25, 1990).

Computer Systems: Further Development of Navy's Source Data System Needs to Be Reassessed (GAO/IMTEC-90-25, May 8, 1990).

Military Space Operations: Operational Problems Continue With the Satellite Control Computer System (GAO/IMTEC-89-56, Aug. 8, 1989).

Air Traffic Control: Voice Communications System Continues to Encounter Difficulties (GAO/IMTEC-89-39, June 1, 1989).

[1]ADP Modernization: IRS Needs to Assess Design Alternatives for Its Electronic Filing System (GAO/IMTEC-89-33, May 5, 1989).

[2]Military Space Operations: Operational Problems Continue With the Satellite Control Computer System (GAO/IMTEC-89-56, Aug. 8, 1989).

ADP Modernization: IRS Needs to Assess Design Alternatives for Its Electronic Filing System (GAO/IMTEC-89-33, May 5, 1989).

Appendix X

Data That Were Inaccurate, Unreliable, or Incomplete

Numerous examples of inaccurate, unreliable, or incomplete data were discovered. One report found that the Veterans Administration had not been able to easily maintain the quality of its information because its data resided in over 150 fragmented automated systems and multiple, ad hoc manual systems.[1] Consequently, the Veterans Administration could not verify the quality of the service it provided to veterans.

In another report, NASA was criticized for not storing any data for some missions and having incomplete data for many important missions.[2] For example, the data collected by the Apollo 9 mission in 1969 had not been stored in a NASA facility and its current location was unknown at the time of the report. For those missions for which NASA had stored data, agency policy only required the archiving of analyzed data, and not the data from which the analysis was derived. Once analyzed, the original data were destroyed. Both NASA's own and other studies have shown the value of retaining original data sets for the use of future researchers.

Related Products

Medicare: Flawed Data Add Millions to Teaching Hospital Payments (GAO/IMTEC-91-31, June 4, 1991).

Customs Automation: Progress Made, More Expected in Revenue Reconciliation Process (GAO/IMTEC-91-27, Mar. 7, 1991).

Tax System Modernization: Status of IRS' Input Processing Initiative (GAO/IMTEC-91-9, Dec. 12, 1990).

Stafford Student Loans: Millions of Dollars in Loans Awarded to Ineligible Borrowers (GAO/IMTEC-91-7, Dec. 12, 1990).

Information Resources: Problems Persist in Justice's ADP Management and Operations (GAO/IMTEC-91-4, Nov. 6, 1990).

Space Operations: NASA Is Not Archiving All Potentially Valuable Data (GAO/IMTEC-91-3, Nov. 2, 1990).

Trademark Automation: Information on System Problems and Planned Improvements (GAO/IMTEC-91-1, Oct. 9, 1990).

[1] Information Resources: Management Commitment Needed to Meet Information Challenges, (GAO/IMTEC-90-27, Apr. 19, 1990).

[2] Space Operations: NASA Is Not Archiving All Potentially Valuable Data, (GAO/IMTEC-91-3, Nov. 2, 1990).

Information Management: Immigration and Naturalization Service Lacks Ready Access to Essential Data (GAO/IMTEC-90-75, Sept. 27, 1990).

Minerals Management Service: Improvements Planned for Automated Royalty Management System (GAO/IMTEC-90-65, July 27, 1990).

Coast Guard: Strategic Focus Needed to Improve Information Resources Management (GAO/IMTEC-90-32, Apr. 24, 1990).

Customs Automation: Duties and Other Collections Vulnerable to Fraud and Abuse (GAO/IMTEC-90-29, Feb. 28, 1990).

Information Resources: Management Commitment Needed to Meet Information Challenges (GAO/IMTEC-90-27, Apr. 19, 1990).

Tax System Modernization: IRS' Efforts to Improve Taxpayer Correspondence (GAO/IMTEC-90-26, Mar. 22, 1990).

ADP Systems: EEOC's Charge Data System Contains Errors but System Satisfies Users (GAO/IMTEC-90-5, Dec. 12, 1989).

ADP Planning: FDA's Plans to Improve Processing of Medical Device and Drug Applications (GAO/IMTEC-89-58, June 13, 1989).

Immigration Reform: Alien Verification System Data Base Problems and Corrective Actions (GAO/IMTEC-89-52, June 26, 1989).

Customs Automation: Internal Control Weaknesses in Customs' Revenue Collection Process (GAO/IMTEC-89-50, Apr. 11, 1989).

Customs Automation: Observations on Selected Automated Commercial System Modules (GAO/IMTEC-89-4BR, Dec. 21, 1988).

Poorly Designed Systems Made Access to Data Time-consuming or Cumbersome

Instances in which agencies' poorly designed or implemented systems made data access difficult were identified. The access problems ranged from an inconvenience or time delay in obtaining information to information being so difficult to retrieve that agency personnel rarely use it.

For example, a 1989 report stated that the Social Security Administration's field offices did not have easy access to information required to process retirement claims.[1] Among other problems, they had to use two different systems to get the information, which caused user dissatisfaction and minor delays in getting needed information. Another report documented that the Coast Guard field office staff found its major law enforcement system so difficult, tedious, and time-consuming to use that staff rarely used the system to support decisions.[2]

Related Products

Customs Automation: Progress Made, More Expected in Revenue Reconciliation Process (GAO/IMTEC-91-27, Mar. 7, 1991).

Trademark Automation: Information on System Problems and Planned Improvements (GAO/IMTEC-91-1, Oct. 9, 1990).

Information Management: Immigration and Naturalization Service Lacks Ready Access to Essential Data (GAO/IMTEC-90-75, Sept. 27, 1990).

Public Access: Two Case Studies of Federal Electronic Dissemination (GAO/IMTEC-90-44BR, May 14, 1990).

Coast Guard: Strategic Focus Needed to Improve Information Resources Management (GAO/IMTEC-90-32, Apr. 24, 1990).

Information Resources: Management Commitment Needed to Meet Information Challenges (GAO/IMTEC-90-27, Apr. 19, 1990).

ADP Planning: FDA's Plans to Improve Processing of Medical Device and Drug Applications (GAO/IMTEC-89-58, June 13, 1989).

ADP Systems: SSA Efforts in Implementing Its Field Office Modernization (GAO/IMTEC-89-45, May 17, 1989).

[1] ADP Systems: SSA Efforts in Implementing Its Field Office Modernization (GAO/IMTEC-89-45, May 17, 1989).

[2] Coast Guard: Strategic Focus Needed to Improve Information Resources Management (GAO/IMTEC-90-32, Apr. 24, 1990).

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